

Use with textbook pages 134-138.

### Properties of waves

Match each term on the left with the best Descriptor on the right. Each Descriptor may be used only once.

Term	Descriptor
1. crest	A. height of crest from rest position
2. trough	B. a movement that carries energy through matter or space
3. amplitude	C. the lowest point of a wave
4. frequency	D. trough to trough
5. wavelength	E. the highest point of a wave
	F. vibrations per second

Circle the letter of the best answer.

- What happens when the amplitude of a wave becomes smaller?
  - the frequency increases
  - the wavelength decreases
  - the height of the crests increases
  - the amount of energy that the wave carries decreases
- Which of the following is **not** a way to measure wavelength?
  - the distance from crest to crest
  - the distance from trough to trough
  - the distance from the top of a crest to the bottom of a trough
  - the distance covered by one complete crest plus one complete trough

Use with textbook pages 144-149.

### Properties of visible light

Match each Term on the left with the best Descriptor on the right. Each Descriptor may be used only once.

Term	Descriptor
1. light	A. explains how light behaves like a wave
2. spectrum	B. light we can see
3. reflection	C. a range of colours or frequencies of visible light
4. refraction	D. occurs when a light wave is absorbed by an object
5. visible light	E. occurs when a light wave bounces off an object
6. wave model of light	F. bending of light wave as it passes from one material to another
	G. wave that travels through space

Circle the letter of the best answer.

- Which of the following statements is true?
  - The wavelength of a wave increases as the frequency increases.
  - The wavelength of a wave increases as the frequency decreases.
  - The wavelength of a wave decreases as the frequency decreases.
  - The wavelength of a wave decreases as the frequency stays the same.
- Use the following diagrams to answer questions 9 and 10.
 

Wave X

Wave Y
- Wave X has a higher frequency than Wave Y.
  - The statement is supported by the diagrams.
  - The statement is not supported by the diagrams.
  - You cannot tell by looking at the diagrams.
  - Neither amplitude nor wavelength is the same for both waves.
- Which statement is correct?
  - Amplitude and wavelength are the same for both waves.
  - Amplitude is the same for both waves.
  - Wavelength is the same for both waves.
  - Neither amplitude nor wavelength is the same for both waves.

- Which of the following correctly places the colours in order of shortest wavelength to longest wavelength?
 

Shortest wavelength	→	Longest wavelength
A. red		green
B. violet		green
C. green		red
D. violet		red

- Which of the following colours has the lowest frequency?
  - blue
  - indigo
  - orange
  - yellow

- Why does a blue car appear to be blue in the sunlight?
  - The car reflects all the colours of the visible spectrum.
  - The car absorbs the colour blue and reflects colours other than blue.
  - The car refracts the colour blue and reflects colours other than blue.
  - The car reflects the colour blue and absorbs colours other than blue.
- Why does the print on this page appear to be black?
  - The print reflects all the colours.
  - The print absorbs all the colours.
  - The print is made up of all the primary colours.
  - The print is made up of all the secondary colours.

Use with textbook pages 152–160.

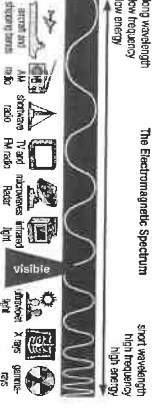
## Visible light and the electromagnetic spectrum

Match each Term on the left with the best Descriptor on the right. Each Descriptor may be used only once.

Term	Descriptor
1. _____ X rays	A. used to heat up left-over pizza
2. _____ microwaves	B. used to broadcast television
3. _____ gamma rays	C. used by computers to read CD-ROMS
4. _____ radio waves	D. used in radiation therapy to kill cancer cells
	E. used by dentists to take a picture of your teeth

Circle the letter of the best answer.

Use the following diagram of the electromagnetic spectrum to answer questions 5 to 10.



5. Which of the following types of radiation has the highest frequency?
- visible light
  - infrared light
  - AM radio waves
  - gamma radiation

Use with textbook pages 168–181.

## The ray model of light

Match each Term on the left with the best Descriptor on the right. Each Descriptor may be used only once.

Term	Descriptor
1. _____ normal	A. equal to the angle of reflection
2. _____ angle of refraction	B. measured between the refracted ray and the normal
3. _____ angle of refraction	C. angle of reflected ray
4. _____ angle of incidence	D. imaginary line that passes through materials at right angle
	E. the surface that reflects

Circle the letter of the best answer.

6. Which of the following is generally associated with radio waves?
- visible radiation
  - high-energy waves
  - high-frequency waves
  - long-wavelength waves
7. Which of the following types of radiation gives off the lowest amount of energy?
- X rays
  - visible light
  - microwaves
  - gamma rays
8. Which of the following correctly places these electromagnetic waves in order from shortest wavelength to longest wavelength?
- visible light, radio waves, ultraviolet light, infrared radiation
  - radio waves, visible light, infrared radiation, ultraviolet light
  - ultraviolet light, visible light, infrared radiation, radio waves
  - ultraviolet light, infrared radiation, radio waves, visible light
9. Which of the following has a higher frequency than visible light?
- infrared waves
  - X rays
  - microwaves
  - radio waves
10. How does the frequency of electromagnetic radiation change as wavelength of the radiation decreases?
- it increases
  - it decreases
  - it stays the same
  - it increases and then decreases

Use with textbook pages 168–181.

## The ray model of light

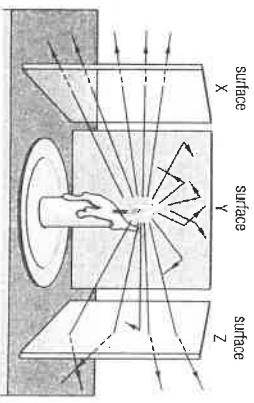
Match each Term on the left with the best Descriptor on the right. Each Descriptor may be used only once.

Term	Descriptor
1. _____ normal	A. equal to the angle of reflection
2. _____ angle of refraction	B. measured between the refracted ray and the normal
3. _____ angle of refraction	C. angle of reflected ray
4. _____ angle of incidence	D. imaginary line that passes through materials at right angle
	E. the surface that reflects

Circle the letter of the best answer.

5. Which of the following statements describes a property of light according to the ray model of light?
- Light travels like waves.
  - Light travels in a straight line.
  - Light is made up of different colours.
  - Light has characteristics like frequency and wavelength.
6. If the angle of incidence is 50°, what is the angle of reflection?
- 5°
  - 25°
  - 50°
  - 100°

Use the following diagram to answer questions 7 and 8.



7. Which of the following is a translucent surface?
- surface X
  - surface Y
  - surface Z
  - surface X and surface Z
8. Which of the following surfaces allow all the light rays to pass through?
- surface X
  - surface Y
  - surface Z
  - surface X and surface Z
9. Which of the following correctly describes opaque objects?
- |      |  |
|------|--|
| I.   | they can absorb all the light                |
| II.  | they can reflect all the light               |
| III. | they do not allow light to pass through them |
| IV.  | they transmit all light                      |
- I and III only
  - II and III only
  - III and IV only
  - I, II, and III

Use with textbook pages 182–189.

## Using mirrors to form images

Match each Term on the left with the best Descriptor on the right. Each Descriptor may be used only once.

Term	Descriptor
1. _____ diverging	A. spreading apart
2. _____ converging	B. coming together
3. _____ plane	C. curves inwards
4. _____ mirror	D. curves outwards
5. _____ mirror	E. is smooth and flat
6. _____ mirror	F. point where light rays meet

6. Which of the following is used to make an image that is the same size as the object?

- A. plane mirror  
 B. convex mirror  
 C. concave mirror  
 D. both concave and convex mirrors  
 E. none of the above

Circle the letter of the best answer.

7. What do all three types of mirrors have in common?  
 A. they all produce upside down images  
 B. they all reflect light rays to form an image  
 C. they all reflect light rays so that the rays diverge and do not meet  
 D. they all reflect light rays so that the rays converge on a focal point

8. What type of image would you expect to see if you looked at yourself in the bowl of a spoon?

- A. an upright, larger image of yourself  
 B. an upright, smaller image of yourself  
 C. an upside down, larger image of yourself  
 D. an upside down, smaller image of yourself

9. Which of the following mirrors can produce an upright image?

I. _____ plane mirror	_____
II. _____ convex mirror	_____
III. _____ concave mirror	_____

- A. I and II only  
 B. I and III only  
 C. II and III only  
 D. I, II, and III  
 E. none of the above

10. Which of the following mirrors can be used to make you look taller?

- A. plane mirror  
 B. convex mirror  
 C. concave mirror  
 D. both convex and concave mirrors  
 E. none of the above

11. Which of the following statements is incorrect about a plane mirror?

- A. It reverses left and right.  
 B. It produces an image in front of the mirror.  
 C. It produces an image that is the same size as the object.  
 D. It produces an image that appears to be the same distance from the mirror as the object.

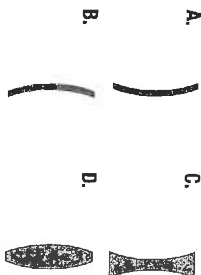
Use with textbook pages 190–193.

## Using lenses to form images

Match the Term on the left with the best Descriptor on the right. Each Descriptor may be used only once.

Term	Descriptor
1. _____ lens	A. point where the converging light rays meet
2. _____ focal length	B. a piece of transparent material that bends light
3. _____ convex lens	C. lens that is thinner in the middle than at the edge
4. _____ concave lens	D. lens that is thicker in the middle than at the edge
	E. distance from the centre of the lens to the focal point

7. Which of the following is a concave lens?



8. A concave lens reflects light rays  
 A. towards the normal  
 B. away from the normal  
 C. along the normal  
 D. none of the above
9. A convex lens reflects light rays  
 A. towards the normal  
 B. away from the normal  
 C. along the normal  
 D. none of the above
10. Light rays converge  
 A. at the focal length  
 B. at the focal point  
 C. inside the lens  
 D. on the edge of the lens

11. If the object is more than two focal lengths from a convex lens, the image will be

- A. upside down and smaller  
 B. upside down and larger  
 C. upright and larger  
 D. no image forms

Use with textbook pages 202–210.

## Human vision

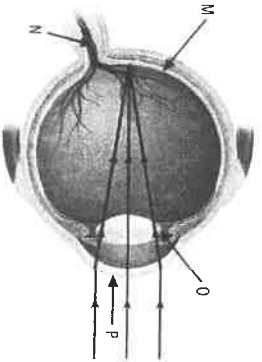
Match each Term on the left with the best Descriptor on the right. Each Descriptor may only be used once.

Term	Descriptor
1. normal vision	A. image forms behind the retina
2. astigmatism	B. image forms in front of the retina
3. far-sightedness	C. no image is formed
4. near-sightedness	D. image forms on more than one point on the retina
	E. image forms on the retina

Circle the letter of the best answer.

5. Which of the following is referred to when we speak about the colour of someone's eyes?
- A. iris  
B. pupil  
C. retina  
D. sclera
6. Which of the following is the white part of the eye?
- A. iris  
B. pupil  
C. sclera  
D. cornea
7. Which of the following statements is true?
- A. The pupil is larger in dim light.  
B. The pupil never changes in size.  
C. The pupil is smaller in dim light.  
D. The pupil is larger in bright light.

Use the following diagram to answer questions 8 to 10.



8. Which of the following structures represents the convex lens of the eye?

- A. M  
B. N  
C. O  
D. P
9. What is the function of the structure labelled N in the diagram?
- A. to focus the light  
B. to send electrical signals to the brain  
C. to provide nutrients and support for the cornea  
D. to control the amount of light that enters the eye
10. Which structure does most of the focussing?
- A. M  
B. N  
C. O  
D. P
11. Which of the following describes how the image of an object appears on the retina?
- A. it is reversed right to left  
B. it is upright  
C. it is upside down  
D. it is a mirror image of the actual object

Use with textbook pages 216–225.

## Extending human vision

Match each Term on the left with the best Descriptor on the right. Each Descriptor may be used only once.

Term	Descriptor
1. camera	A. uses two lenses to see the Moon
2. binoculars	B. used to magnify small, close objects
3. microscope	C. used to transmit telephone and Internet signals
4. reflecting telescope	D. uses a concave mirror, a plane mirror, and a convex lens to see distant stars
5. refracting telescope	E. design is similar to the eye; uses a convex lens
	F. made of two refracting telescopes

Circle the letter of the best answer.

6. What does the term “focus” mean?
- A. to make the image look larger than the real size  
B. to absorb light and record a tiny part of the whole image  
C. to make light strike a boundary between two materials causing it to reflect  
D. to make a clear image by adjusting the distance between the screen and the lens
7. During which situation does an image appear focussed?
- A. when light rays diverge on the screen  
B. when light rays converge on the screen  
C. when light rays converge behind the screen  
D. when light rays converge in front of the screen

8. What does a microscope use to magnify objects?

- A. one convex lens  
B. two convex lenses  
C. two concave lenses  
D. a convex lens and a concave lens

9. Which of the following applies to both refracting telescopes and microscopes?

I.	uses only two lenses
II.	gathers and focusses light into an enlarged image
III.	light rays pass through a convex eyepiece lens to magnify objects even more

- A. I and II only  
B. I and III only  
C. II and III only  
D. I, II, and III

10. Which of the following is false about optical fibres?

- A. can transmit laser light  
B. are opaque glass fibres  
C. make use of total internal reflection  
D. used in telecommunications and in medicine

11. Which of the following is false about laser light?

- A. is used in surgery  
B. is just one wavelength  
C. carries a small amount of energy  
D. has all the crests and troughs lined up